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Surface Dynamics of Untethered Chains on top of Chemically Identical Polymer Brushes BULENT AKGUN, NIST Center for Neutron Research, GOKCE UGUR, The University of Akron, ZHANG JIANG, SURESH NARAYANAN, Argonne National Laboratory, SUSHIL SATIJA, NIST Center for Neutron Research, MARK D. FOSTER, The University of Akron — The dynamics of the surface height fluctuations on untethered chains spun cast on chemically identical homopolymer brushes are studied using X-ray photon correlation spectroscopy (XPCS) and neutron reflectivity (NR). These dynamics are found to be well described by theory of overdamped capillary waves. Underlying brush layer alters dramatically the dynamics of the film surface of PS chains atop the brush. Surface dynamic behavior strongly depends on the interpenetration of free chains into the brush layer which is dictated by the thickness of untethered chains, thickness and grafting density of the brush layer. Increase of underlying brush thickness or decrease of brush grafting density, increases the interpenetration of free chains into the brush layer and increases relaxation time constants. The interpenetration depth decreases with increasing molecular weight of untethered chains.

Bulent Akgun
NIST Center for Neutron Research

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